

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 **Claim 1 (original):** A data updating system using
2 differential data, comprising:

3 a differential data producing unit which has a
4 plurality of versions of data for producing the
5 differential data representing the difference between a
6 pre-updating file as one version of data and a
7 post-updating file as another version of the data;

8 a communicating unit which transfers the differential
9 data; and

10 a post-updating file restoring unit which receives the
11 differential data, and restores the post-updating file
12 based on the already stored pre-updating file and the
13 received differential data,

14 wherein the differential data includes Move data
15 indicating zero, one, or a plurality of Move instructions
16 to move and copy data from a part or all of the
17 pre-updating file and Add data indicating zero, one, or a
18 plurality of Add instructions to add and copy data in the
19 differential data.

1 **Claim 2 (original):** The data updating system

2 according to claim 1, wherein the differential data is made
3 of the Add data instead of the Move data when the length of
4 the Move data is smaller than a prescribed threshold.

1 **Claim 3 (original):** The data updating system
2 according to claim 1, wherein in the differential data, the
3 Move data has data length information indicating the length
4 of a data string to be copied and address information
5 indicating the location of the data string to be copied;
6 and

7 wherein at least one of the data length information
8 and the address information is made of a variable bit
9 length.

1 **Claim 4 (original):** The data updating system
2 according to claim 1, wherein in the differential data, the
3 Move data has data length information indicating the length
4 of a data string to be copied and address information
5 indicating the location of the data string to be copied, a
6 relative address for moving the data string being used as
7 the address information, and

8 wherein when the same relative address value appears
9 in a plurality of pieces of Move data, the one or more
10 relative address values are expressed by one or more bits.

1 **Claim 5 (original):** A differential data producing

device in a data updating system for producing differential data representing the difference between a pre-updating file as one version of data and a post-updating file as another version of the data, transferring the differential data to another location through a communication unit, and restoring the post-updating file based on the stored pre-updating file at the transfer destination and the differential data,

the differential data producing device, comprising:

a matching data string search unit which searches the pre-updating file for a data string which is matched with a data string in the post-updating file;

a Move/Add determining unit which determines whether to produce Move data or Add data as the differential data based on the search result, the Move data indicating a Move instruction to move and copy a matching data string from a part or all of the pre-updating file to the post-updating file, and the Add data indicating an Add instruction to add and copy a data string in the differential data to the post-updating file;

a Move data output unit which outputs the Move data;

and

an Add data output unit which outputs the Add data,

wherein the differential data has zero, one, or a plurality of pieces of the Move data and zero, one, or a plurality of pieces of the Add data.

1 **Claim 6 (original):** The differential data producing
2 device according to claim 5, wherein the Move data output
3 unit includes a separator output unit for outputting a
4 separator made of particular data indicating the beginning
5 of the Move data; and

6 wherein data expressing the Move instruction is
7 outputted after outputting of the separator.

1 **Claim 7 (original):** The differential data producing
2 device according to claim 5, wherein when prescribed data
3 used as the separator exists in the Add data, the Add data
4 output unit outputs prescribed data indicating that the
5 prescribed data is not a separator following the data.

1 **Claim 8 (original):** The differential data producing
2 device according to claim 5, wherein the Move/Add
3 determining unit determines that the Move data unit outputs
4 the matching data string as the Move data when the length
5 of the matching data string is equal to or greater than a
6 prescribed threshold and that the Add data output unit
7 outputs the matching data strings as the Add data when the
8 length of the matching data string is smaller than the
9 prescribed threshold.

1 **Claim 9 (original):** The differential data producing

2 device according to claim 8, wherein when the differential
3 data producing device is used for a data updating system
4 that transfers a program and data in a computing system
5 using a 32-bit CPU, the threshold in the Move/Add
6 determining unit is set to five bytes.

1 **Claim 10 (original):** The differential data producing
2 device according to claim 8, wherein when the differential
3 data between the pre-updating file as one version and the
4 post-updating file as another version is produced, the
5 differential data is produced by using a plurality of
6 different thresholds as the threshold in the Move/Add
7 determining unit; and

8 wherein the differential data having a minimum size is
9 employed.

1 **Claim 11 (original):** The differential data producing
2 device according to claim 5, wherein the Move/Add
3 determining unit compares the sizes of differential data
4 between when the matching data string is expressed by the
5 Move data and when the data string is expressed by the Add
6 data, and determines that the data having a smaller size is
7 to be selected.

1 **Claim 12 (original):** The differential data producing
2 device according to claim 5, wherein the Move data output

3 unit provides a data length continuation flag made of one
4 or more bits in the beginning byte or word of the Move
5 data;

6 wherein the length of the data string to be copied
7 from the pre-updating file is expressed only by information
8 in the byte or word when the data length continuation flag
9 takes a prescribed first state; and

10 wherein data length information is outputted when the
11 data length continuation flag takes a prescribed second
12 state different from the first state, the data length
13 information indicating that information expressing the
14 length of the data string continues in one or more bytes or
15 words in or after the byte or word is continued.

1 **Claim 13 (original):** The differential data producing
2 device according to claim 12, wherein the Move data output
3 unit provides a data length continuation flag made of one
4 or more bits in or after the second byte or word of the
5 Move data;

6 wherein the length of the data string to be copied
7 from the pre-updating file is expressed by information
8 between the beginning byte or word of the Move data and the
9 byte or word, when the data length continuation flag takes
10 the prescribed first state; and

11 wherein data length information is outputted when the
12 data length continuation flag takes the prescribed second

13 state different from the first state, the data length
14 information indicating that information expressing the
15 length of the data string in one or more bytes or words in
16 and after the byte or word is continued.

1 **Claim 14 (original):** The differential data producing
2 device according to claim 5, wherein the Move data output
3 unit outputs address information that uses an absolute
4 address in at least one of the pre-updating file and the
5 post-updating file as information indicating a location for
6 moving a data string to be copied from the pre-updating
7 file to the post-updating file in the Move data.

1 **Claim 15 (original):** The differential data producing
2 device according to claim 5, wherein the Move data output
3 unit outputs address information that uses a relative
4 address indicating the difference between the location of
5 a data string in the pre-updating file and the location of
6 the data string in the post-updating file as information
7 indicating a location for moving the data string to be
8 copied from the pre-updating file to the post-updating
9 file.

1 **Claim 16 (original):** The differential data producing
2 device according to claim 5, wherein the Move data output
3 unit and the Add data output unit produce and output the

4 Move data and the Add data based on the order of data
5 strings in the post-updating file; and

6 wherein the Move data output unit outputs address
7 information that uses a relative address indicating the
8 difference between the beginning location of a data string
9 in the pre-updating file and the size of restored data in
10 the post-updating file as information indicating a location
11 for moving the data string to be copied from the
12 pre-updating file to the post-updating file.

1 **Claim 17 (currently amended):** The differential data
2 producing device according to claim 15 ~~or 16~~, wherein the
3 Move data output unit outputs an address continuation flag
4 made of one or more bits in the beginning byte or word of
5 the data string in the address information by the relative
6 address in the Move data;

7 wherein the Move data output unit expresses the
8 relative address only by the information in the byte or
9 word when the address continuation flag takes a prescribed
10 first state; and

11 wherein the Move data output unit outputs address
12 information indicating that information that expresses the
13 relative address continues in one or more bytes or words in
14 and after the byte or word when the address continuation
15 flag takes a prescribed second state different from the
16 first state.

1 **Claim 18 (original):** The differential data producing
2 device according to claim 17, wherein the Move data output
3 unit provides an address continuation flag made of one or
4 more bits in and after the second byte or word in the data
5 string in the address information by the relative address
6 in the Move data; and

7 wherein the Move data output unit outputs address
8 information indicating that information that expresses the
9 relative address by information between the beginning byte
10 or word of the data string in the address information and
11 the byte or word when the address continuation flag takes
12 the prescribed first state, and that expresses the relative
13 address in one or more bytes or words in and after the byte
14 or word when the address continuation flag takes the
15 prescribed second state different from the first state.

1 **Claim 19 (currently amended):** The differential data
2 producing device according to claim ~~15~~~~or 16~~, wherein when
3 the same relative address exists in a plurality of pieces
4 of Move data in address information in the Move data, the
5 Move data output unit expresses the one or more relative
6 addresses by one or more bits in the beginning byte of word
7 of the Move data.

1 **Claim 20 (original):** The differential data producing

device according to claim 5, wherein the Move data output unit outputs address information that uses a relative address indicating the difference between the location of the data string in the pre-updating file and the location of the data string in the post-updating file or the difference between the beginning location of the data string in the pre-updating file and the size of restored data in the post-updating file as information representing the location of a data string to be copied from the pre-updating file to the post-updating file in the Move data;

wherein an address change flag made of one or more bits is provided in the Move data;

wherein the Move data output unit outputs address information by the relative address following data length information indicating the length of the data string when the address change flag takes a prescribed first state; and

wherein the Move data output unit omits information expressing the relative address as the relative address in the previous Move data and the relative address in the present Move data are the same when the address change flag takes a prescribed second state different from the first state.

Claim 21 (currently amended): The differential data producing device according to ~~any one of claims 15, 16, and~~

3 ~~20~~claim 15, wherein the Move data output unit expresses the
4 relative address in the address information in the Move
5 data by the amount of change from the relative address in
6 the previous Move data.

1 **Claim 22 (original):** A differential data producing
2 program enabling a computer to implement the functions of
3 the unit in the differential data producing device in the
4 data updating system according to any one of claims 5 to
5 21.

1 **Claim 23 (original):** A post-updating file restoring
2 device in a data updating system receiving differential
3 data representing the difference between a pre-updating
4 file as one version of data and a post-updating file as
5 another version of the data and restoring the post-updating
6 file based on the pre-updating file stored in the
7 post-updating file restoring device and the differential
8 data,

9 the post-updating file restoring device, comprising:
10 a Move/Add determining unit which determines whether
11 the differential data is Move data representing a Move
12 instruction to move and copy a matching data string from a
13 part or all of the pre-updating file to the post-updating
14 file or Add data representing an Add instruction to add and
15 copy a data string in the differential data to the

16 post-updating file;
17 a Move data restoring unit which outputs a data string
18 corresponding to the Move data; and
19 an Add data restoring unit which outputs a data string
20 corresponding to the Add data,
21 wherein the post-updating file is produced from the
22 differential data.

1 **Claim 24 (original):** The post-updating file restoring
2 device according to claim 23, wherein in the differential
3 data, the Move/Add determining unit discriminates data
4 expressing a Move instruction and provided after a
5 separator made of particular data as the Move data and data
6 expressing an Add instruction provided between the
7 beginning of the differential data or the end of the
8 previous Move data and the presence of the separator as the
9 Add data.

1 **Claim 25 (original):** The post-updating file restoring
2 device according to claim 24, wherein when the separator is
3 present in a data string and data following the separator
4 is particular data in the differential data, the Move/Add
5 determining unit determines the separator as data present
6 in the Add data, the data being used as a separator instead
7 of the separator.

1 **Claim 26 (original):** The post-updating file restoring
2 device according to claim 23, wherein the Move data
3 restoring unit determines data length information provided
4 in the Move data to determine the length of a data string
5 to be copied from the pre-updating file to the
6 post-updating file, and detects a data continuation flag
7 made of one or more bits in the beginning byte or word of
8 the Move data;

9 wherein when the data length continuation flag takes
10 a prescribed first state, the data Move data restoring unit
11 determines the data length information from information in
12 the byte or word, and determines the length of the data
13 string to be copied; and

14 wherein when the length of the data length
15 continuation flag takes a prescribed second state different
16 from the first state, the Move data restoring unit
17 determines that the data length information continues in
18 one or more bytes or words in and after the byte or word.

1 **Claim 27 (original):** The post-updating file restoring
2 device according to claim 26, wherein the Move data
3 restoring unit detects a data length continuation flag made
4 of one or more bits in and after the second byte or word of
5 the Move data;

6 wherein when the data length continuation flag takes
7 the prescribed first state, the Move data restoring unit

8 determines data length information from information between
9 the beginning byte or word of the Move data and the byte or
10 word; and

11 wherein when the data length continuation flag takes
12 the prescribed second state different from the first state,
13 the Move data restoring unit determines that the data
14 length information continues in one or more bytes or words
15 in and after the byte or word.

1 **Claim 28 (original):** The post-updating file restoring
2 device according to claim 23, wherein the Move data
3 restoring unit determines address information provided in
4 the Move data, and determines a location for moving a data
5 string is to be copied from the pre-updating file to the
6 post-updating file; and

7 wherein the Move data restoring unit determines
8 address information expressed by a relative address
9 representing the difference between the location of the
10 data string in the pre-updating file and the location of
11 the data string in the post-updating file or the difference
12 between the beginning location of the data string in the
13 pre-updating file and the size of restored data in the
14 post-updating file.

1 **Claim 29 (original):** The post-updating file restoring
2 device according to claim 28, wherein the Move data

3 restoring unit detects an address continuation flag made of
4 one or more bits in the beginning byte or word in the data
5 string in address information by the relative address in
6 the Move data;

7 wherein the Move data restoring unit determines the
8 address information of the relative address from
9 information in the byte or word to determine the location
10 of the data string to be copied when the address
11 continuation flag takes the prescribed first state; and

12 wherein the Move data restoring unit determines that
13 the address information continues in one or more bytes or
14 words in and after the byte or word when the address
15 continuation flag takes the prescribed second state
16 different from the first state.

1 **Claim 30 (original):** The post-updating file restoring
2 device according to claim 29, wherein the Move data
3 restoring unit detects an address continuation flag made of
4 one or more bits in and after the second byte or word in
5 the data string in the address information by the relative
6 address in the Move data;

7 wherein the Move data restoring unit determines the
8 address information of the relative address from the
9 beginning byte or word of the data string in the address
10 information or information in the byte or word to determine
11 the location of the data string to be copied when the

12 address continuation flag takes the prescribed first state;
13 and
14 wherein the Move data restoring unit determines that
15 the address information continues in one or more bytes or
16 words in and after the byte or word when the continuation
17 flag takes the prescribed second state different from the
18 first state.

1 **Claim 31 (original):** The post-updating file restoring
2 device according to claim 28, wherein the Move data
3 restoring unit determines address information expressed by
4 one or more bits in the Move data, and determines the
5 location of the data string to be copied, one or more
6 relative address values corresponding to the address
7 information being the same relative address values.

1 **Claim 32 (original):** The post-updating file restoring
2 device according to claim 28, wherein the Move data
3 restoring unit detects an address change flag made of one
4 or more bits in the Move data, and determines address
5 information by the relative address provided following data
6 length information representing the length of the data
7 string to be copied, when the address change flag takes a
8 prescribed first state; and
9 wherein the Move data restoring unit determines the
10 location of the data string to be copied using the same

11 relative address as the relative address in the previous
12 Move data when the address change flag takes a prescribed
13 second state different from the first state.

1 **Claim 33 (original):** A post-updating file restoring
2 program for enabling a computer to implement the functions
3 of the units in the post updating file restoring device in
4 the data updating system according to any one of claims 23
5 to 32.

1 **Claim 34 (new):** The differential data producing
2 device according to claim 16, wherein the Move data output
3 unit outputs an address continuation flag made of one or
4 more bits in the beginning byte or word of the data string
5 in the address information by the relative address in the
6 Move data;

7 wherein the Move data output unit expresses the
8 relative address only by the information in the byte or
9 word when the address continuation flag takes a prescribed
10 first state; and

11 wherein the Move data output unit outputs address
12 information indicating that information that expresses the
13 relative address continues in one or more bytes or words in
14 and after the byte or word when the address continuation
15 flag takes a prescribed second state different from the
16 first state.

1 **Claim 35 (new):** The differential data producing
2 device according to claim 16, wherein when the same
3 relative address exists in a plurality of pieces of Move
4 data in address information in the Move data, the Move data
5 output unit expresses the one or more relative addresses by
6 one or more bits in the beginning byte of word of the Move
7 data.

1 **Claim 36 (new):** The differential data producing
2 device according to claim 16, wherein the Move data output
3 unit expresses the relative address in the address
4 information in the Move data by the amount of change from
5 the relative address in the previous Move data.

1 **Claim 37 (new):** The differential data producing
2 device according to claim 20, wherein the Move data output
3 unit expresses the relative address in the address
4 information in the Move data by the amount of change from
5 the relative address in the previous Move data.